of said target individual, said target individual's tissue optical spectrum having a plurality of measurement values, wherein said measurement values are correlated with tissue properties that are invariant at a wavelength of illumination light with respect to the presence and intensity of other wavelengths of illumination light;

a comparator adapted to compare said target individual tissue optical spectrum and said enrolled person's tissue optical spectrum and provide a measure of a degree of similarity between said target individual's tissue optical spectrum and said enrolled person's tissue optical spectrum; and

an indicator adapted to identify at least one of said enrolled persons if the corresponding measure of the degree of similarity meets an established threshold value.

43. 40

~~50.~~ (New) The system recited in claim ~~49~~, wherein said optical spectra include near-infrared wavelengths.

44. 40

~~51.~~ (New) The system recited in claim ~~49~~, wherein said optical spectra include visible wavelengths.

45. 40

~~52.~~ (New) The system recited in claim ~~49~~, wherein said optical spectra ~~include near-ultraviolet wavelengths.~~

REMARKS

In the Office Action dated September 18, 2002 (paper no. 14), all of the claims were rejected under 35 U.S.C. §102 and/or §103 in view of certain references cited either alone or in combination. Applicants thank the Examiner for the courtesy of discussing the Office Action and the prior art as it pertains to the application in a telephone interview conducted on November 8, 2002.

Claim 48 has been canceled, Claims 1 – 3, 6 – 8, 10, 12, 15 – 17, 19 – 21, 33, 46, and 47 have been amended, and Claims 49 – 52 have been added. New Claims 49 – 52 are intended to provide apparatus claims that do not use means-plus-function language and care has been taken to ensure that they track language in pending claims that use means-plus-function language. In particular, Claim 49 corresponds to Claim 10, with the spectrometer of Claim 12 recited explicitly, and Claims 50 – 52 correspond respectively to Claims 15 – 17. The amendments to the claims correct certain antecedent bases and ensure that the following limitations exist in each of the claims: (1) that the spectral data used in the identifications or verifications are optical spectral data (*see, e.g.,* Application, p. 16, ll. 11 – 14) and (2) that the identifications or verifications be based on linear optical properties of the tissue.

This linearity is recited in all the amended claims by requiring that the measurement values be correlated with tissue properties that are invariant at a wavelength of illumination light with respect to the presence and intensity of other wavelengths of illumination light. Examples of such correlations with the measurement values are provided in the application at p. 25, l. 16 – p. 26, l. 6, which describes the calculation of a difference spectrum for comparison of spectra on a wavelength-by-wavelength basis. In particular, at each wavelength, the difference spectrum is dependent only on the target individual's spectrum and one of the reference spectra *at that wavelength*. The ability for identity verifications to be performed using this linearity is disclosed in the application at, for example, p. 10, ll. 16 – 20.

As discussed below, this combination of limitations provides significant advantages, particularly in permitting a much simpler system that is less costly and requires less complex instrumentation than is described in the cited prior art.

<u>A. Wunderman</u>

Claims 10, 12, 15 – 18, 20, 33 – 39, 42 – 44, 47, and 48 stand rejected under 35 U.S.C. §102(e) as anticipated by U.S. Pat. No. 6,122,042 ("Wunderman"); Claims 1 – 3, 6 – 9, 19, 21 – 26, 29 –32, and 48 stand rejected under 35 U.S.C. §103(a) as unpatentable over Wunderman in view of U.S. Pat. No. 4,944,021 ("Hoshino"); Claim 28 stands rejected as unpatentable over Wunderman in view of Hoshino and U.S. Pat. No. 5,559,504 ("Itsumi"); Claim 40 stands rejected as unpatentable over Wunderman in view of U.S. Pat. No. 5,163,094 ("Prokoski"); and Claim 41 stands rejected as unpatentable over Wunderman in view of Itsumi.

Wunderman discloses a method of spectroscopy that is based on optical *nonlinearities* of a material (Wunderman, Col. 9, ll. 22 – 25) and suggests that such optical nonlinearities may be used as a means to identify individuals (*id.*, Col. 37, ll. 55 56). The nonlinear characteristics described by Wunderman are manifested by the fact that wavelength *combinations* are used to derive the nonlinearities:

> When a conventional single wavelength is applied to a material, its intensity must be sufficient to begin to "saturate" some occupied density of states at the energy. But since only a small non-linearity results from a large applied intensity, the non-linearity is thus difficult to resolve. However, when the detected interaction effects of two overlapping wavelengths (A and B) are measured, their algebraically, detected sum (A separate + B separate), and their combined superimposed sum (A + B, simultaneous) can readily be compared to say, 16-bit to 24-bit accuracy.
> (*Id.*, Col. 9, ll. 25 – 35).

These wavelength combinations are then achieved by illuminating combinations of light sources (*see generally, id.,* Col. 9, ll. 13 – 57), with Wunderman emphasizing that the use of wavelength combinations as part of its "IDEA" probe is "essential" to its disclosure:

> The IDEA probe can simultaneously apply any or all combinations of excitation wavelengths and search for nonsuperposition whenever the difference between the combined-applied detected signal and the separately applied algebraically summed signals does not equal zero.... The non-zero difference for the 32,767 comparisons thus provides a signature of that material. This measurement of optical non-linearity via a deviation from zero is a new and powerful form of spectroscopy *that forms an essential feature of this invention.*
> (*Id.*, Col. 10, l. 64 – Col. 11, l. 9, emphasis added).

In marked contrast, Applicants have identified that it is possible to derive sufficient identification information from spectral data with measurement values that are

PATENT

correlated with *linear* optical properties of the tissue, thereby avoiding the complexity advocated by Wunderman in deriving nonlinear characteristics.

In the telephone interview on November 8, 2002, the Examiner indicated that he viewed certain language in Wunderman as pointing to a motivation to combine it with other prior art for consideration of patentability under 35 U.S.C. §103(a) in the event that the amendments were found to avoid anticipation under 35 U.S.C. §102. Accordingly, Applicants offer the following additional remarks regarding the applicability of Wunderman under 35 U.S.C. §103(a). The language cited by the Examiner as providing such a motivation is the following:

> A simple example of an identification process as discussed in this invention is articulated below to exemplify how one discrimination algorithm works. Numerous other algorithmic methods may also be used, and typically more esoteric than the description here.
> (Wunderman, Col. 38, ll. 32 – 36).

The specific discrimination algorithm referred to in this language provides an example of a numerical technique that may be used to perform a comparison of the tissue optical nonlinearities as manifested in the multiple-wavelength comparisons that are essential to Wunderman's method (as well as a comparison of hand geometry). The cited language may properly be read as indicating that other numerical techniques may be used to perform the comparison and that Wunderman is not to be limited by the specific numerical technique disclosed. There is, however, nothing in the statement to suggest that an identification can be performed using anything other than the optical nonlinearities that Wunderman elsewhere identifies as "essential" to its method (*id.*, Col. 11, ll. 6 – 9), regardless of the algorithm used to compare them. Indeed, to use the linear optical properties as now recited in the claims would change the principle of operation of Wunderman, a factor that strongly indicates it is *not* appropriately combined with other references (*see* MPEP 2143.01). Moreover, Wunderman's teaching that the use of optical nonlinearities is essential indicates that there would be no expectation of success if it were modified to use linear optical properties in the manner now recited. This point

was, in fact, made by Applicants in the parent to this application, U.S. Pat. Appl. No. 09/415,594, which has been incorporated by reference (Application, p. 1, ll. 5 – 13), when they remarked on the detrimental nature of nonlinearities:

> It has been found that minimization of specular light via appropriate index matching is critical due to the fact that specular artifacts are difficult to model with conventional spectrographic modeling tools. Specular light is additive in intensity units, but non-linear in absorbance units. As partial least squares analysis is conducted in absorbance space, such non-linearities are detrimental to the analysis due to the fact that a partial least squares analysis is a linear model.
> (U.S. Pat. Appl. No. 09/415,594, p. 17, ll. 20 – 25).

The use of linear optical properties by Applicants leads directly to a number of advantages over Wunderman and other prior art, particularly in the ability to use less expensive and less complex instrumentation. This arises because the basis of the identification in Wunderman is a signal that is exceedingly small in most materials under modest illumination powers ("virtually all optical-to-excited-electron-phonon systems are *slightly* non-linear," Wunderman, Col. 10, l. 45, emphasis added). Wunderman thus requires much more expensive and complex instrumentation that the present invention because the search for optical nonlinearities in the sample "requires that detector linearities must be excellent over a large dynamic range" (*id.*, Col. 10, l. 14; *see also id.*, Col. 11, l. 42 regarding the requirement that the IDEA probe needs to provide a "highly accurate measurement" to observe the small optical nonlinearities).

The element of the claims requiring that measurement values be correlated with tissue properties that are invariant at a wavelength of illumination light with respect to the presence and intensity of other wavelengths of illumination light is also not disclosed in any of Hoshino, Itsumi, and Prokoski. Accordingly, for at least these reasons, it is believed that the claims are patentable.

B. Stoianov

Claims 1, 21, and 46 stand rejected under 35 U.S.C. §102(b) as anticipated by U.S. Pat. No. 5,761,330 ("Stoianov").

Stoianov teaches the use of optical-digital hybrid techniques for automating fingerprint verification to identify an individual (Stoianov, Col. 1, ll. 6 – 9). In performing such identifications, Stoianov simply uses the well-known technique of comparing spatial fingerprint-pattern structures with a database of recorded fingerprint patterns (*id.*, Col. 5, ll. 27 – 39). As such, it is one of several examples of prior art that is limited to disclosing the use of *spatially* distributed characteristics for performing the identification of individuals. Common examples of the use of such spatially distributed characteristics include not only identifications made from spatial fingerprint distributions, but also from spatial distributions of vascular structure, spatial distributions of facial features, spatial distributions of bone structure, and the like.

This is in marked contrast to the pending claims, which now recite that comparison be based on linear optical properties of tissue in making identifications. Rather than rely on discerning spatially distributed characteristics of an individual, Applicants have recognized that it is instead possible to use the claimed methods and apparatus to perform identifications based on such linear optical properties. For at least this reason, it is believed that the claims are patentable over Stoianov.

C. Toyoda

Claims 1, 21 – 25, and 46 stand rejected under 35 U.S.C. §102(e) as anticipated by U.S. Pat. No. 5,999,637 ("Toyoda")

Toyoda is also limited to disclosing identifications based on spatially distributed characteristics, and focuses particularly on the use of fingerprint identifications (Toyoda, Col. 4, ll. 63 – 66), as acknowledged in the Office Action.

Toyoda does not teach or suggest making identifications based on linear optical properties of tissue as the claims now require. For at least this reason, it is believed that the claims are patentable over Toyoda.

D. Prokoski and Hoshino

Claims 1, 21, 27, and 46 stand rejected under 35 U.S.C. §103(a) over Prokoski in view of Hoshino.

Prokoski is a further example of prior art that teaches the use of spatially distributed characteristics to perform an identification. In this instance, it teaches the use of thermograms to identify individuals from biosensor data (Prokoski, Col. 3, ll. 19 – 23). Such thermograms reflect data related to the *spatial* structural configuration of blood vessels beneath skin, as well as spatial structural configurations of bone and cartilage structures. It is because of this focus on spatially derived structural identifications that Prokoski teaches identifying specific elemental shapes as providing a "signature" of an individual used in confirming identity (*id.*, Col. 3, ll. 38 – 42).

Neither Prokoski nor Hoshino teaches or suggests making identifications based on linear optical properties of tissue as the claims now require. For at least this reason, it is believed that the claims are patentable over the combination of Prokoski and Hoshino.

E. Messerschmidt, Robinson, and Peterson

Claims 10, 12 – 14, 20, 33, and 47 stand rejected under 35 U.S.C. §103(a) as unpatentable over the combination of U.S. Pat. No. 5,655,630 ("Messerschmidt"), U.S. Pat. No. 4,975,581 ("Robinson"), and U.S. Pat. No. 6,330,346 ("Peterson"); and Claims 1, 3 – 5, 19, 21, and 46 stand rejected under 35 U.S.C. §103(a) as unpatentable over this combination further in view of Hoshino.

Messerschmidt is cited for its disclosure of obtaining spectral data from tissue and Peterson is cited for its use of spectral information in performing identifications (Office Action, p. 12). However, Applicants respectfully disagree with the assertion in the Office Action that Peterson teaches using the spectral information "in a manner very similar to that of Messerschmidt" (*id.*, p. 12).

In particular, Peterson is like some of the other prior art references discussed above in that its teachings are limited to the use of *spatially* distributed characteristics in performing identifications. This is evident not only from its reference to "illuminating subcutaneous structure and/or conditions" for comparison with stored indicia (Peterson, Col. 1, ll. 16 – 23), but also from the description of the device used:

> As seen in FIG. 1, a plurality of infrared light-emitting diodes are arranged, as is explained in detail hereinafter, such that they provide relatively even and continuous illumination of the object. The sensor array which is spaced by the mask and located beneath the field of view limiting holes assures that there is no cross-feed which might distort the image.
> (*Id.*, Col. 2, ll. 49 – 55).

The emphasis by Peterson on collection of an "image" and the need to avoid distortions by cross talk makes it clear that it is describing a method for illuminating subcutaneous tissue to collect spatially distributed structural information. There is nothing in Peterson that suggests the use of linear optical properties of tissue in making identifications.

Applicants thus continue to traverse the assertion in the Office Action that there is a motivation to combine the teachings of Messerschmidt and Peterson. There is no suggestion in these references that it would be beneficial to use the spectral-distribution determinations of Messerschmidt with the spatial-distribution determinations of Peterson. Explained differently, Messerschmidt describes a *non-imaging* system that uses the measurement of multiple wavelengths of light as the input data to a spectrum analyzer (Messerschmidt, Figs. 1 and 2). In contrast, Peterson's system is an *imaging* system based on an array of source and detector elements (Peterson, Col. 2, l. 58 and Fig. 1).

 PATENT

Indeed, Applicants believe that at the time of their invention, it would not have been clear to one of skill in the art why or how an identification technique based on linear optical properties of tissue as embodied in the claims could work. For example, the specific illustration provided by Messerschmidt is concerned with using the spectrographic techniques for quantifying glucose levels in individuals (Messerschmidt, Col. 5, ll. 49 – 54). Knowing this glucose level is insufficient to distinguish large groups of individuals (and indeed seems better for grouping them rather than discriminating among them), particularly since glucose levels vary over time in response to metabolic functions. It was only the product of Applicants' insight that identified how optical spectral distributions could be used for identification purposes on an individual-by-individual basis and over time.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 303-571-4000.

Respectfully submitted,

Patrick M. Boucher
Reg. No. 44,037

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, 8th Floor
San Francisco, California 94111-3834
Tel: 303-571-4000
Fax: 415-576-0300
PMB:pmb
DE 7087240 v1

1- (303) 571 - 4321
pmboucher@townsend.com

APPENDIX: VERSION WITH MARKINGS TO SHOW CHANGES MADE

The changes made to the claims by the foregoing Amendment are highlighted by underlining added material and enclosing deleted material in square brackets.

Claim 48 has been canceled, Claims 1 – 3, 6 – 8, 10, 12, 15 – 17, 19 – 21, 33, 46, and 47 have been amended, and Claims 49 – 52 have been added so that the pending claims read as follows:

1. (Amended) A system for verifying the purported identity of a targeted individual comprising:

an enrollment database including tissue optical spectra**[l data]** collected from at least one enrolled persons, said enrolled persons tissue optical spectra **[data]** having a plurality of measurement **[values]** wavelengths;

means for obtaining at least one tissue optical spectra**[l data]** and purported identity from said target individual, said target individual's tissue optical spectra**[l data]** having a plurality of measurement values, wherein said measurement values are correlated with tissue properties that are invariant at a wavelength of illumination light with respect to the presence and intensity of other wavelengths of illumination light;

means for comparing said target individual tissue optical spectra**[l data]** and said enrolled persons tissue optical spectra**[l data]**, said enrolled person tissue optical spectra corresponding to the purported identity of the target individual, said comparison providing a measure of the degree of similarity between said target individual tissue optical spectra**[l data]** and said enrolled person's tissue optical spectra**[l data]**; and

means for positively verifying said target individual's identity by confirming that said target individual's measure of spectral similarity is at least as similar as an established threshold value.

PATENT

2. (Amended) The system as recited in claim 1, wherein said means for obtaining said target individual tissue optical spectra**[l data]** includes means for measuring optical radiation reflected from sub-epidermal tissue of said target individual.

3. (Amended) The system as recited in claim 1, wherein said means for obtaining said target individual tissue optical spectra**[l data]** includes a spectrometer.

4. (As Filed) The system as recited in claim 3, wherein said spectrometer is an FTIR spectrometer.

5. (As Filed) The system as recited in claim 3, wherein said spectrometer is a grating array spectrometer.

6. (Amended) The system as recited in claim 1, wherein said optical spectra**[l data]** include near-infrared wavelengths.

7. (Amended) The system as recited in claim 1, wherein said optical spectra**[l data]** include visible wavelengths.

8. (Amended) The system as recited in claim 1, wherein said optical spectra**[l data]** include near-ultraviolet wavelengths.

9. (As Filed) The system as recited in claim 1, wherein said comparison and similarity determination utilizes a classification algorithm.

10. (Twice Amended) A system for identifying a target individual comprising:

an enrollment database including tissue optical spectral data collected from one or more enrolled persons, said enrolled persons tissue optical spectra**[l data]** having a plurality of measurement wavelengths **[values]**;

means for obtaining at least one tissue optical spectra**[l data]** from said target individual, wherein said means for obtaining said target individual tissue optical

spectra**[l data]** includes means for measuring optical radiation reflected from sub-epidermal tissue of said target individual, said target individual's tissue optical spectra**[l data]** having a plurality of measurement values, wherein said measurement values are correlated with tissue properties that are invariant at a wavelength of illumination light with respect to the presence and intensity of other wavelengths of illumination light;

means for comparing said target individual tissue optical spectra**[l data]** and said all enrolled persons tissue optical spectra**[l data]**, said comparison providing a measure of the degree of similarity between said target individual's tissue optical spectra**[l data]** and said enrolled persons tissue optical spectra**[l data]**; and

means for indicating identity as at least one of the said enrolled persons if the corresponding measure of degree of similarity is at least as similar as an established threshold value.

11. (Previously Canceled).

12. (Amended) The system as recited in claim 10, wherein said means for obtaining said target individual's tissue optical spectra**[l data]** includes a spectrometer.

13. (As Filed) The system as recited in claim 12, wherein said spectrometer is an FTIR spectrometer.

14. (As Filed) The system as recited in claim 12, wherein said spectrometer is a grating array spectrometer.

15. (Amended) The system as recited in claim 10, wherein said optical spectra**[l data]** include near-infrared wavelengths.

16. (Amended) The system as recited in claim 10, wherein said optical spectra**[l data]** include visible wavelengths.

17. (Amended) The system as recited in claim 10, wherein said optical spectra**[l data]** include near-ultraviolet wavelengths.

18. (As Filed) The system as recited in claim 10, wherein said comparison and similarity determination utilizes a classification algorithm.

19. (Amended) A system for verifying the purported identity of a target individual comprising:

a computer including an input device and an output device;

an enrollment database including tissue optical spectra for at least one enrolled persons;

means for obtaining at least one tissue optical spectrum from said target individual, including an optical radiation source, an optical sampler for projecting optical radiation into the tissue and for collecting radiation that substantially passed through sub-epidermal tissue, an optical spectrometer for measuring the sub-epidermal optical intensity over a plurality of wavelengths, wherein said target individual's tissue optical spectrum has a plurality of measurement values correlated with tissue properties that are invariant at a wavelength of illumination light with respect to the presence and intensity of other wavelengths of illumination light;

means for obtaining said target individual's purported identity; and

a program running in said computer for comparing said target individual tissue optical spectrum**[a]** and said enrolled persons tissue optical spectra corresponding to said target individual's purported identity.

20. (Amended) A system for identifying a target individual comprising:

a computer including an input device and an output device;

an enrollment database including tissue optical spectra for at least one enrolled persons;

means for obtaining at least one tissue optical spectrum from said target individual, including an optical radiation source, an optical sampler for projecting optical radiation into the tissue and for collecting radiation that substantially passed through sub-epidermal tissue, an optical spectrometer for measuring the sub-epidermal optical intensity over a plurality of wavelengths, wherein said target individual's tissue optical spectrum has a plurality of measurement values correlated with tissue properties that are invariant at a wavelength of illumination light with respect to the presence and intensity of other wavelengths of illumination light; and

a program running in said computer for comparing said target individual tissue optical spectrum**[a]** and all said enrolled persons tissue optical spectra.

21. (Amended) A method for verifying the purported identity of a target individual utilizing an enrollment database including tissue optical spectra collected from a number of enrolled individuals having known identities, said tissue optical spectra **[spectral data]** having a plurality of measurement wavelengths, comprising the steps of:

obtaining optical target tissue spectral data from said target individual, said optical target tissue spectral data having a number of measurement **[wavelengths]** values, wherein said measurement values are correlated with tissue properties that are invariant at a wavelength of illumination light with respect to the presence and intensity of other wavelengths of illumination light;

obtaining said purported identity from said target individual;

comparing said optical target **[individual optical]** tissue spectra**[l data]** and said enrolled person's tissue optical spectra**[l data]**, said enrolled person's tissue optical spectra corresponding to the purported identity of the target individual, said comparison providing a measure of the degree of similarity between said optical target **[optical]** tissue spectra**[l data]** and said enrolled person's tissue optical spectra**[l data]**; and

positively verifying said target individual's identity by confirming that said target individual's measure of spectral similarity is at least as similar as an established threshold value.

22. (As Filed) The method for verifying the identity of a target individual as recited in claim 21, wherein the method further includes a classification algorithm to perform said comparison between said target individual's optical spectral data and said enrolled person's optical spectral data.

23. (As Filed) The method for verifying the identity of a target individual as recited in claim 22, wherein the method further includes classification features that are determined from a set of calibration optical spectral data collected on at least one individual measured more than one time.

24. (As Filed) The method for verifying the identity of a target individual as recited in claim 23, wherein said classification features are applied to the said comparison between the target optical spectral data and the enrollment spectral data to determine the similarity with respect to the said classification features.

25. (As Filed) The method for verifying the identity of a target individual as recited in claim 24, wherein said verification occurs when said comparison of said target optical spectral data and said enrollment spectral data using said classification features is at least as good a predetermined measure of similarity.

26. (As Filed) The method for identifying a target individual as recited in claim 21, further comprising an enrollment database with optical spectral data collected from a number of enrolled individuals, wherein said number is greater than one.

27. (As Filed) The method for identifying a target individual as recited in claim 21, further comprising an enrollment database with optical spectral data collected from a number of enrolled individuals, wherein said number is equal to one.

28. (As Filed) The method for identifying a target individual as recited in claim 21, wherein said target spectrum is added to said enrollment optical spectral data after said verification of identity.

29. (As Filed) The method for identifying a target individual as recited in claim 21, wherein said tissue optical spectra include near-ultraviolet wavelengths.

30. (As Filed) The method for identifying a target individual as recited in claim 21, wherein said tissue optical spectra include visible wavelengths.

31. (As Filed) The method for identifying a target individual as recited in claim 21, wherein said tissue optical spectra include near-infrared wavelengths.

32. (As Filed) The method for identifying a target individual as recited in claim 21, wherein said tissue spectra includes a substantial spectra contribution from sub-epidermal tissue.

33. (Twice Amended) A method for identifying a target individual utilizing an enrollment database including tissue optical spectra collected from a number of enrolled **[individuals]** persons, said **[spectral data]** tissue optical spectra having a plurality of measurement wavelengths, comprising the steps of:

obtaining optical target tissue spectral data from said target individual**[s]**, said optical target tissue **[optical]** spectral data having a number of measurement values **[wavelengths, wherein said tissue spectra]** and including**[e]** a substantial spectral contribution from sub-epidermal tissue, wherein said measurement values are correlated with tissue properties that are invariant at a wavelength of illumination light with respect to the presence and intensity of other wavelengths of illumination light;

comparing said optical target **[individual optical]** tissue spectral data and said enrolled person's tissue optical spectra **[spectral data]**, said comparison providing a

measure of the degree of similarity between said optical target **[optical]** tissue spectral data and each of said enrolled person's tissue optical spectra **[spectral data]**; and

positively establishing said target individual's identity by confirming that said target individual's measure of spectral similarity is at least as similar to one of the enrolled person's optical spectral data as an established threshold value.

34. (As Filed) The method for identifying a target individual as recited in claim 33, wherein the method further includes a classification algorithm to perform said comparison between said target individual's optical spectral data and said enrolled persons optical spectral data.

35. (As Filed) The method for identifying a target individual as recited in claim 34, wherein the method further includes classification features that are determined from a set of calibration optical spectral data collected on at least one individual measured more than one time.

36. (As Filed) The method for identifying a target individual as recited in claim 35, wherein said classification features are applied to the said comparison between the target optical spectral data and the enrollment spectral data to determine the similarity with respect to the said classification features.

37. (As Filed) The method for identifying a target individual as recited in claim 36, wherein said identification occurs when said comparison of said target optical spectral data and said enrollment spectral data using said classification features is at least as similar as a predetermined measure of similarity for a number of enrolled persons optical spectral data.

38. (As Filed) The method for identifying a target individual as recited in claim 37, wherein the target identify is chosen as the most similar of all said enrolled persons whose enrollment spectral data are at least as similar to the said target spectral data as a predetermined measure of similarity.

39. (As Filed) The method for identifying a target individual as recited in claim 33, further comprising an enrollment database with optical spectral data collected from a number of enrolled individuals, wherein said number is greater than one.

40. (As Filed) The method for identifying a target individual as recited in claim 33, further comprising an enrollment database with optical spectral data collected from a number of enrolled individuals, wherein said number is equal to one.

41. (As Filed) The method for identifying a target individual as recited in claim 33, wherein said target spectrum is added to said enrollment optical spectral data after said identification.

42. (As Filed) The method for identifying a target individual as recited in claim 33, wherein said tissue optical spectra include near-ultraviolet wavelengths.

43. (As Filed) The method for identifying a target individual as recited in claim 33, wherein said tissue optical spectra include visible wavelengths.

44. (As Filed) The method for identifying a target individual as recited in claim 33, wherein said tissue optical spectra include near-infrared wavelengths.

45. (Previously Canceled).

46. (Amended) A method for verifying the identity of a target individual comprising the steps of:

obtaining a number of enrollment optical tissue spectra from a number of individuals, said enrollment <u>optical</u> tissue **[optical]** spectra having a plurality of measurement wavelengths, said enrolled <u>optical</u> tissue **[optical]** spectra corresponding to said enrolled individual's identities;

obtaining an optical target tissue spectrum from said target individual, said optical target tissue spectrum having a number of measurement **[wavelengths]** values, wherein said measurement values are correlated with tissue properties that are invariant at a wavelength of illumination light with respect to the presence and intensity of other wavelengths of illumination light;

obtaining an identifier from said target individual**[s]**;

selecting said enrolled optical tissue spectra**[l data]** that corresponds to said target individual's identifier;

performing discriminant analysis on said optical target tissue spectrum and said selected enrolled optical tissue **[spectral data]** spectrum corresponding to said identifier; and

positively verifying said target identity if, and only if, said discriminant analysis is satisfied.

47. (Twice Amended) A method for identifying a target individual comprising the steps of:

obtaining a number of enrollment optical tissue spectra from a number of individuals, said enrollment optical tissue **[optical]** spectra having a plurality of measurement wavelengths;

obtaining an optical target tissue spectrum from said target individual, said optical target tissue spectrum having a number of measurement values **[wavelengths]**, wherein said optical tissue spectra include a substantial spectral contribution from sub-epidermal tissue and wherein said measurement values are correlated with tissue properties that are invariant at a wavelength of illumination light with respect to the presence and intensity of other wavelengths of illumination light;

performing discriminant analysis on said optical target tissue spectrum and all of said enrollment**[ed]** optical tissue spectra**[l data]**; and

positively identifying said target identity if, and only if, said discriminant analysis is satisfied for at least one of said enrolled persons optical tissue spectral data.

48. (Canceled)

49. (New) A system for identifying a targeted individual comprising:

an enrollment database including tissue optical spectra collected from at least one enrolled person, each of said enrolled person's tissue optical spectrum having a plurality of measurement wavelengths;

a spectrometer adapted to obtain at least one tissue optical spectrum from said target individual by measuring optical radiation reflected from subepidermal tissue of said target individual, said target individual's tissue optical spectrum having a plurality of measurement values, wherein said measurement values are correlated with tissue properties that are invariant at a wavelength of illumination light with respect to the presence and intensity of other wavelengths of illumination light;

a comparator adapted to compare said target individual tissue optical spectrum and said enrolled person's tissue optical spectrum and provide a measure of a degree of similarity between said target individual's tissue optical spectrum and said enrolled person's tissue optical spectrum; and

an indicator adapted to identify at least one of said enrolled persons if the corresponding measure of the degree of similarity meets an established threshold value.

50. (New) The system recited in claim 49, wherein said optical spectra include near-infrared wavelengths.

51. (New) The system recited in claim 49, wherein said optical spectra include visible wavelengths.52. (New) The system recited in claim 49, wherein said optical spectra include near-ultraviolet wavelengths.

B